

Ceramic Change in Ethnoarchaeological Perspective: A Kalinga Case Study

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CERAMIC CHANGE LIES at the core of archaeological research, as a reflection of cultural change that leaves visible traces in the archaeological record. Ceramics are the most sensitive class of artifacts for studying prehistoric change, especially when the change occurs over a short time period. Ceramic change has been studied in the archaeological records of myriad culture areas, yet basic issues regarding rates of change and their causes remain poorly understood and require additional archaeological and ethnoarchaeological study.

Ceramic change is embedded within the context of a culture's social and cognitive system (Adams 1989:62). This is problematic for archaeologists, who recover fragmentary evidence at best for social and economic aspects of change. In spite of continuing debates over the uses of analogy in archaeology (e.g., Gould and Watson 1982; Wylie 1985), ethnoarchaeology provides one strategy for investigating the variety of factors responsible for ceramic change. Such an approach assumes a basic similarity between observed changes in contemporary material culture systems and the processes responsible for ceramic change viewed in the archaeological record (cf. Arnold 1987). Ethnoarchaeological research builds foundations for archaeological interpretation by attempting to understand the entire sociocultural context in which these ceramic changes occur.

This study consists of two sections: a comparative discussion of factors behind, and manifestations of, ceramic change, and the presentation of Kalinga ceramic change as an ethnoarchaeological case study. The latter section focuses on a community in part of Kalinga-Apayao Province in the Northern Philippines (Fig. 1). Changes in the contemporary Kalinga ceramic assemblage in the last twenty-five years are described, and the dynamic sociopolitical context of the change is explored. The focus of the case study is on technical and stylistic modifications of the water jar (*immosso*) and on the emergence of a suite of nontraditional forms known as "toys" or *ay-ayam*.

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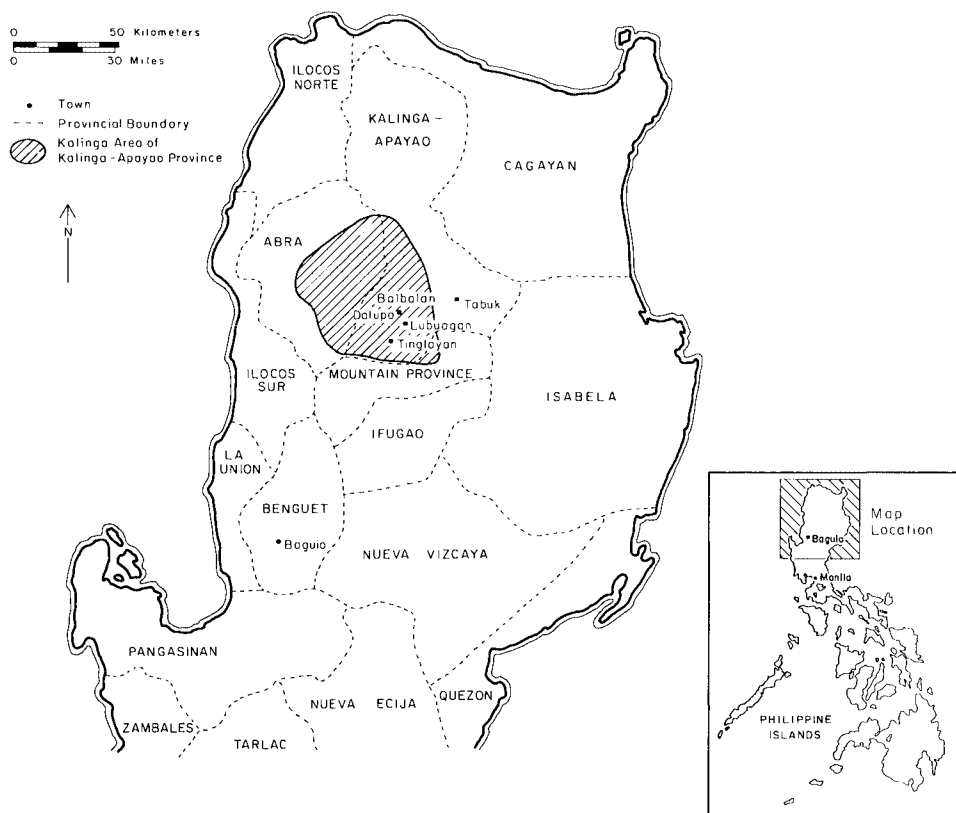


Fig. 1. Northern Luzon provinces, the Philippines.

CERAMIC CHANGE IN ETHNOGRAPHIC PERSPECTIVE

From an archaeological perspective, ceramic change is recognizable at the level of either the attribute or the assemblage. Changes at the attribute level includes the innovation of and shifts in the frequency of morphological and stylistic attributes, while changes at the assemblage level include the replacement of decorative styles or vessel forms, the introduction of a new technology, and shifts in the organization of production. Major demographic and dietary changes are reflected in prehistoric cooking vessels from highland Mesoamerica (Feinman et al. 1984) and woodland North America (Schiffer and Skibo 1987). Specialized pottery production reflects emergent state formation in Mesoamerica (cf. Feinman et al. 1984, Rice 1978). The impact of conquest is seen in the introduction of new ceramic forms among the Inka (cf. Costin et al. 1989) or in the presence of Spanish-influenced ceramic styles (Tschopik 1950).

Numerous ethnographic studies allude to ceramic change (Kramer 1985; Nicklin 1971), but too few of them have focused on details of the process. Internal factors, such as population growth and innovative individuals, are important elements in ceramic innovation that remain largely unexplored. External influences are major contributors to processes of ceramic change across the world. The availability of better transportation (cf. Mossman and Selsor 1988; Papousek 1984), increasing artic-

ulation in the national economy (Stolmaker 1976), and the construction of new roadways (cf. Arnold 1978; Bankes 1985; Nicklin 1981) may lead to an expansion in the scale of pottery production and distribution networks. Competitive emulation (Miller 1982), foreign pressure, the introduction of new ceramic technologies, and emergent tourist art markets are also important external catalysts of ceramic change worldwide (e.g., Arnold 1978, 1987; Balfet 1965; Cardew 1952; DeBoer and Lathrap 1979; Diaz 1966; Foster 1960, 1965; Hendry 1957; Herbich 1981; Lathrap 1976; Linares de Sapir 1969; Lister and Lister 1987; Papousek 1981, 1989; Rice 1978; Roth 1935; Stolmaker 1976; Wade 1985).

Ceramic change occurs in the technofunctional and stylistic domains, as well as in the organization of ceramic production. Ceramic production systems respond to demands for new products (e.g., Annis 1985; Glick 1977; Lackey 1988). Systems also change to accommodate new functions, which may involve industries that use ceramic components in the production process (e.g., Foster 1965:54; Glick 1977; Hallifax 1894:40; Mossman and Selsor 1988:221). Changes in ceramic design have been correlated with response to market demand (Scheans 1977:47). Ceramic traditions previously produced at the household level (*sensu* Peacock 1982; van der Leeuw 1977) may be reorganized into cooperatives or multihousehold workshops (e.g., Arnold 1987).

To summarize, the ethnographic and archaeological records provide complementary perspectives on processes of ceramic change. The ethnographic record provides detail on the cultural contexts in which ceramic change occurs. The archaeological record provides evidence for the long-term results of such changes. Ethnoarchaeologists can focus on rates of ceramic change and on particular factors in the process. Ethnoarchaeological research, like the Kalinga case study that follows, contributes to the construction of holistic models of prehistoric ceramic change.

BACKGROUND TO THE KALINGA CASE STUDY

This study was conducted under the aegis of the Kalinga Ethnoarchaeological Project (KEP) during the 1987–1988 field season. Begun in 1973, the project has now produced substantial research on Kalinga ceramic production, distribution, and use (Graves 1981, 1985; Longacre 1974, 1981, 1985; Longacre et al. 1988; Skibo 1990; Stark 1991). The study area involves communities in the Pasil River valley in the southern portion of the Kalinga subprovince. The Pasil Municipality consists of 13 separate, politically independent communities. Settlement size ranges from 30 to over 100 households. The 1987–1988 KEP field season focused on the Pasil villages of Dalupa, Dangtalan, and Guina-ang (Fig. 2).

The results presented here are from research conducted in the community of Dalupa Pasil between October 1987 and June 1988. The multiple sources of data used in this analysis were gathered with the aid of Kalinga assistants. Data sources include field observations, a survey on “Origin of Nontraditional Forms,” and a pottery exchange log (a comprehensive record of Dalupa pottery exchange transactions for 1988). A separate survey on nontraditional forms was administered to all Dalupa potters for each type of nontraditional pot produced, collecting information on the potter’s motivations for producing it and timing of adoption of the new form. Household pottery inventories from Dalupa, Dangtalan, and Guina-ang were also used in this study.

Kalinga potters in the village of Dangtalan formed the focus of research for the

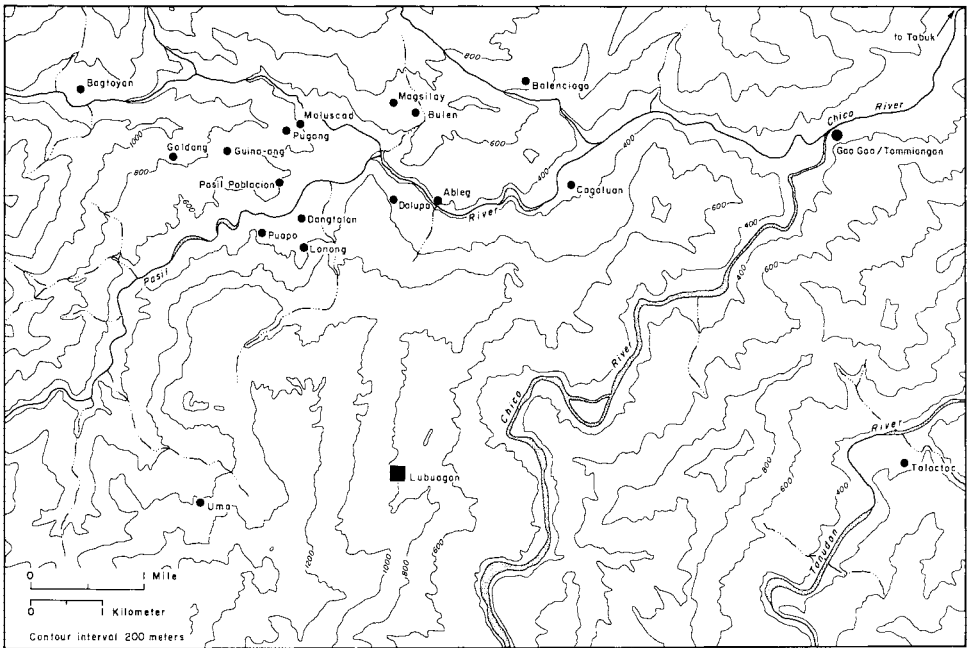


Fig. 2. Map of the study area, the Pasil Municipality.

first decade of the KEP. Between the first and second field seasons, pottery making in the neighboring community of Dalupa escalated, and pottery production in Dangtalan decreased. Expanding population, especially after World War II; the dwindling availability of untilled, potential farmland; and a paucity of wage labor opportunities have compelled Dalupa potters to increase the scale of their ceramic production. During the 1987–1988 study, more Dalupa women made pots, and Dalupa potters generally made more pots than their counterparts in Dangtalan.

Because of this heightened production, the village of Dalupa (Fig. 3) became the focus of the 1987–1988 field study, which investigated aspects of Dalupa ceramic production and distribution. Fifty-six women in the village were reported to be potters at that time, but the amount of time the women spent potting varied greatly, from “retired” potters to part-time specialists. Thirty percent of the potters were wholly inactive during the field season. The reasons for their inactivity included retirement (due to old age), child bearing, child rearing, temporary emigration, or other economic pursuits, such as running a family store. In all, about 39 Dalupa potters were active during the study period.

Pottery production in Dalupa represents one part-time craft specialization that enables households to meet subsistence needs. Individual potters adjust the schedule of their pottery making to fit the intensive rice cultivation schedule, but pottery making is a community-level specialization for Dalupa (Stark 1991). As in most communities, intensive rice cultivation and a developing coffee cash crop provides an economic foundation for Dalupa households. The Dalupa pottery production and distribution system operates outside a centralized market system, and relies on foot and truck transport to reach exchange destinations.

The traditional Dalupa pottery assemblage includes only a few vessel forms and



Fig. 3. Map of Dalupa.

resembles the Dangtalan repertoire described by Longacre (1981). Two forms of cooking pots (for rice, and meat or vegetables) and a water storage jar are the primary ceramic containers that Dalupa potters manufacture. Metal pots (*calderos*) are now widely used for daily rice cooking, decreasing the demand for and production of ceramic rice cooking pots (*ittoyom*). No acceptable metal substitute has been found for meat and vegetable cooking, so the ceramic *oppaya* is still used on a daily basis. Plastic containers, often in the form of recycled motor oil canisters, may be used for water transport, but clay water jars (*immosso*) are found in every Dalupa household. Two major changes are evident in the Dalupa ceramic repertoire since 1975: morphological and stylistic changes in the water jar (*immosso*) and the development of nontraditional forms (*ay-ayam*).

CONTEXTS OF KALINGA CERAMIC CHANGE

Ceramic change in Dalupa is best understood in the broader context of socio-political, environmental, and ecological changes that have occurred in the Kalinga area over the last two decades. These sociopolitical events (and their byproducts) led to stylistic variation in extant vessels, expansion of the range of ceramic types, and expansion of the network of customers involved in Dalupa potters' production system.

Perhaps the most significant force of change in the Pasil Municipality was the Chico River dam controversy that began in the early 1970s and extended well into the 1980s. A massive, four-dam hydroelectric development project sought to construct the Chico River Dams in the Kalinga area to provide electrification to (non-Kalinga) urban areas. Kalinga resistance to these efforts (which would have meant the relocation of 10,000 Kalingas) provoked the incursion of Philippine military and federal employees into the area (cf. Carino et al. 1979). The military involvement provoked the entry of the New People's Army (the military arm of the Communist Party of the Philippines) to strengthen the antigovernment battle (cf. Rocamora 1979; Winnacker 1979).

Although it failed, the Chico River development project nonetheless caused profound changes in the Kalinga area. Non-Kalinga values and commodities were introduced, municipal facilities were constructed, road networks were improved, and motor transport systems were encouraged. Road networks now link formerly isolated Kalinga villages. These dam-related developments have enabled the Dalupa pottery system to expand in scale. Sporadic income from wage labor associated with the dam efforts (e.g., road construction, cultural commissions) trickled into the Kalinga economy during the dam era. Due to the more or less regular motor transport begun in the 1970s that facilitated travel between communities during this period, Dalupa potters expanded their regional exchange network and diversified their products. Cash also entered the traditional barter economy through villagers' employment in reactivated gold mines and dam-related construction efforts.

The environmental and ecological contexts of Kalinga life have also changed. Kalinga's wealth of resources has been a boon for native populations, but it has also been a burden in its appeal to outsiders since the sixteenth century (Fry 1983). Ethnohistoric Spanish accounts report gold mining in northern Luzon by the local population. Modern interest in mining was most recently renewed in the 1970s. Mining operations have effectively destroyed riverine resources that were important supplements to the Kalinga subsistence system (Dozier 1966:134-135).

The once lush tropical forests on mountain slopes are now disappearing as a result of the actions of lumber companies that have obtained permission from the Philippine government to log vast tracts of forest. Government-encouraged logging operations, and the accompanying restrictions imposed by logging companies on access to areas of operation, affect Dalupa residents in two ways: (1) less land is available for swidden agriculture (*uma*), eliminating a subsistence supplement to intensive rice cultivation; and (2) restricted access to forest resources compels Dalupa potters to modify their manufacturing technology. The following sections discuss how these broader changes have affected the Dalupa pottery industry.

THE KALINGA WATER JAR

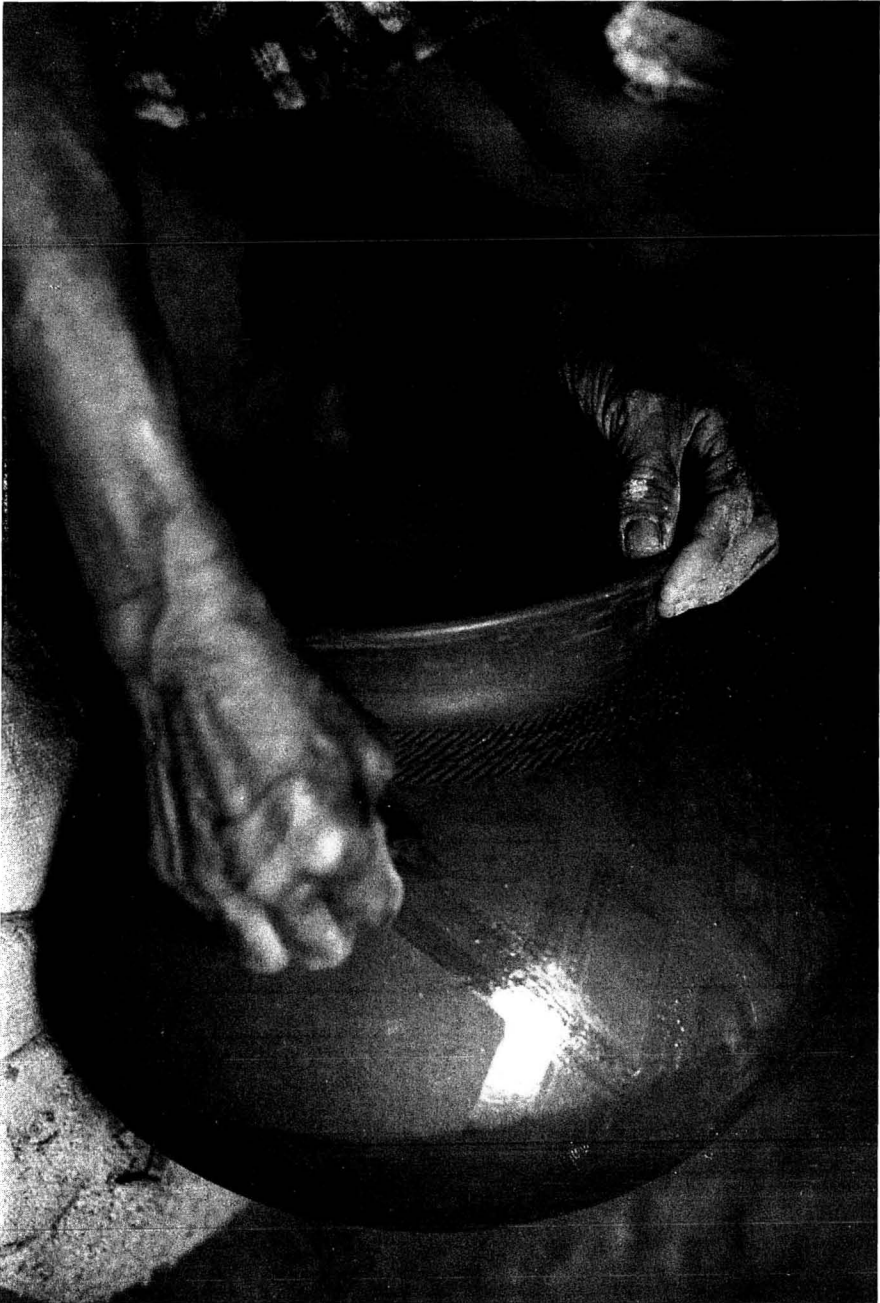
Utilitarian Kalinga pots traditionally exhibit minimal surface decoration: A few incised lines of decoration around the vessel's neck and a band of ocher suffice as ornamentation (Longacre 1981). The Kalinga water jar (*immosso*) differs from Kalinga cooking vessels (*oppaya*, *ittoyon*) only in the uniform coating of resin and ocher across its exterior surface. Interviews with potters in the village of Dalupa suggested that technological and stylistic changes occurred in the *immosso* around 1978–1980. These changes consisted of: (1) simplification in the reduction of resin; (2) stylistic elaboration in the use of decorative ocher embellishment; and (3) morphological innovation, with the introduction of a pronounced *Binontoc* shoulder (Pl. I).

REDUCTION OF RESIN

Kalinga pottery technology for producing innovated water jars has simplified, in the postfiring application of an organic material locally called *lebu*, a resin from the *almaciga* tree (genus *Agathis*). Traditionally, the exterior of the water jar was completely coated with resin. These traditional styles were documented by W. Longacre in Dangtalan in 1975. The tradition of coating the interior and the exterior of the *immosso* with resin (*lebu*) has now been modified so that only the interior of the vessel and the exterior to the shoulder are coated. Resin was traditionally obtained from itinerant resin traders (often residents of communities near the forested resin areas) who visited Dalupa and Dangtalan with resin supplies.

Recent political and economic events have decreased the availability of resin for Dalupa potters. One source area for resin is located in the Batong Buhay gold mine area. The mine's reactivation in the mid-1970s made less resin available for Dalupa potters, because mining provided an alternative source of income to former resin traders. The influx of cash from reactivated gold mines near resin sources has also led to increased highway robbery. Bandits and frequent skirmishes between communist insurgents and the Philippine military hinder travel to resin source areas and endanger the safety of resin harvesters.

A second resin source is located in areas used by the commercial logging company, Cellophil Resources Corporation, which in 1973 penetrated Abra Province (immediately west of Kalinga-Apayao Province). By 1975, Cellophil had constructed a kraft pulp mill (Dorral 1979:117). The mill was built near the Kalinga-Apayao–Abra boundary, to facilitate logging in Abra, Kalinga-Apayao, and Mountain Province. North of Pasil, widespread deforestation through commercial logging has reduced the total forested area where resin-bearing trees are located. More serious for potters has been the ban on access to the remaining forest areas



Pl. I. Kalinga *Binontoc* water jar with decorative ocher embellishment on burnished surface.

by Cellophil; trespassers who harvest forest resources are heavily fined (see Dorral 1979).

Potters have responded to these changes by opting with greater frequency for nonresined vessel exteriors.

DEVELOPMENT OF OCHER DESIGNS

Ocher, also referred to as a form of hematite, is widely used to decorate ceramic vessel surfaces (cf. Arnold 1985). Red ocher is an earthy form of hematite mixed with clay (Shepard 1963:36). On traditional Kalinga water jars, an ocher paint was applied to the entire exterior surface. Ocher is now used to create elaborate designs across the outside of the *immosso*. Geometric and floral ocher designs are common motifs on water jars, and anthropomorphic designs are occasionally added to the surfaces as well. In contrast, cooking pots continue to sport no more than an incised neckband of decoration and a band of red paint lining the vessel's interior lip. One reason decorative innovations did not affect cooking pots is that the overall sooting process that occurs during use over a fire would obscure surface ocher decorations.

Ocher decorations on the Dalupa water jars reflect political changes during the 1970s and 1980s. During the Chico River Dam efforts, the Philippine government attempted to curry favor with the Kalingas by establishing cooperatives to encourage and commercialize traditional crafts. Backstrap loom weaving, for example, produces Kalinga blankets, skirts, and G-strings; more recently, pillowcases and belts have been incorporated into the repertoire of woven goods. These ephemeral cooperatives drew Kalinga artisans from surrounding tributary valleys into Lubuagan, the former regional capital of Kalinga. Dalupa potters who traveled to Lubuagan to trade their pots interacted with weavers who suggested modifications for exterior surface decorations of Kalinga water jars. Ocher designs derived from woven blankets and skirts were incorporated into exterior surface designs of the Dalupa water jar.

INTRODUCTION OF THE BINONTOC SHOULDER

The water jars documented and collected in 1976 by W. Longacre are globular vessels with restricted apertures; water jars observed in 1988 in the village of Dalupa exhibited a nontraditional form in their low, sharply angled shoulders. The Kalinga term for the style is *Binontoc*, since the stylized shoulder derives from a ceramic tradition in the neighboring province of Bontoc. Water jars, like large rice or vegetable cooking pots, are more difficult to make than standard cooking vessels. For this reason, water jars are made by older, experienced potters. Pottery production records from the 1988 season list 34 *immosso* makers, or 87 percent of the Dalupa potters who produced water jars in 1987 and 1988. These potters include the shouldered variety in their repertoires and vary in the frequency with which they produce the *Binontoc* style, partly in response to perceived demand and also from personal preference.

Most potters polled agree on the inspiration for the *Binontoc* style: Two older potters encountered the style in Lubuagan in the late 1960s. Interestingly, the *Binontoc*-style water jar initiated in Dalupa during the late 1960s was not readily adopted by the neighboring village of Dangtalan. Museum collections and photographic records from the 1975–1976 field season contain no evidence of *Binontoc*-style water jars in Dangtalan, and Dangtalan potters interviewed during 1988 re-

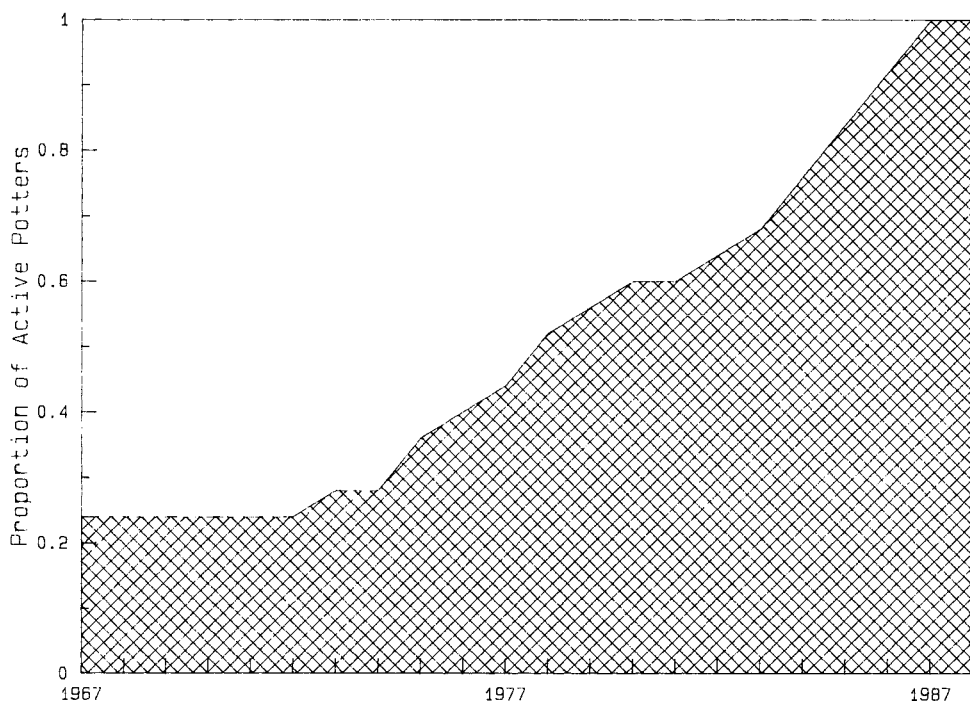


Fig. 4. Rate of *Binontoc* water jar innovation in Dalupa.

ported that they never embraced the *Binontoc* style because the shoulder is difficult to scrape. Since Dalupa is now the dominant pottery-making village for the Pasil River valley, most water jars now found in the valley's villages are made in Dalupa, and a large proportion of these vessels are *Binontoc* in style.

As part of a protracted process of change that began in the 1960s, the modified style of water jar has diffused across most of the Dalupa potting community. The positive response from "consumers" of Kalinga pottery in other Pasil villages has encouraged these changes. The rate of water jar innovation presented in Figure 4 is based on a sample of 25 potters interviewed (73.5 percent of potters making *Binontoc* water jars). By 1987–1988, most active Dalupa potters produced *Binontoc* water jars with exterior ocher decorations. The *Binontoc* innovation has been successful and widespread, based on the responses of water jar producers and users.

INNOVATION IN CERAMIC FORM: KALINGA AY-AYAM

The development of nontraditional forms in Dalupa has followed a shorter temporal path of innovation than the *Binontoc* water jars. The production of nontraditional forms began in earnest during the late 1970s (one potter made her first flower-pot as a schoolgirl for a class project, but Dalupa potters launched their full-scale efforts later). Pottery exchange records from the 1987–1988 field season indicate that 87 percent of all Dalupa potters produced at least one nontraditional form, and most produce a suite of types. All of the potters who produce *Binontoc*-style water jars also make nontraditional forms. These potters are considered "experts," and many are

TABLE 1. RANGE OF NONTRADITIONAL FORMS (AY-AYAM) IN DALUPA

KALINGA TERM	ENGLISH DESCRIPTION
Flower vase	Flower vase ^a
Coffee cups and platter	Coffee cups and platter
Flowerpot	Flowerpot
God bless	"God bless our home" plaques
Souvenir/photo	Souvenir/photo plaques
Ashtray/flower vase	Combination ashtray/flower vase
Ashtray	Ashtray
<i>Gus-gusi</i>	Chinese porcelain jar
<i>Palato</i>	Plate
<i>Ba-ol</i>	Bowl
<i>Picha</i>	Pitcher
<i>Kapatila</i>	Teapot
<i>Caldero</i>	Cauldron
<i>Timba</i>	Bucket
<i>Char-charpong</i>	Miniature stove set
Candleholder	Candelabra
<i>Arcanda</i>	Money bank ^b

^aIncludes hanging shell flower vase.

^bIncludes following shapes: pig (*folok*), dog (*aso*), cat (*kusa*), duck (*pato*), chicken (*manok*), fish (*ikan*, *bangus*), cow (*baka*), carabao (*luang*), elephant (elephant), lion (lion), rat (*utut*), turtle (*chagga*), frog (*tukak*), owl (*ko-op*), deer (*ugsa*), monkey (*kaeg*), bird (*isiwit*), person (*tako*), Chinese jar (*gusi*), pot (*banga*), squash (*calabasa*).

part-time specialists whose households are dependent upon returns from pottery exchange for economic support.

Almost one-third of those Dalupa potters making nontraditional forms do not make shouldered water jars. By local standards, these potters are considered beginners, who have not yet mastered the skills required for manufacturing the more technically complex water jars. Several of these "beginners" began making pots in the early to mid-1980s, when prolonged dry periods resulted in food shortages that affected most of the Pasil area. For "beginners" who lack proficiency in making traditional vessels, the manufacture of nontraditional forms provides an important source of household revenue.

Dalupa potters currently manufacture a broad range of nontraditional forms. At least 50 different types of "souvenirs" were recorded during the 1987–1988 research season (Table 1), ranging from candelabras and flower vases to money banks and imitation teapots. Not all potters make nontraditional forms, and those who do concentrate on a few types. Four nontraditional forms are widely produced: money banks, flower vases, flowerpots, and miniature replicas of the Kalinga heirloom porcelain jar or *gusi*. Ideas for new designs are found in elementary school textbooks, the rare Manila magazine that wends its way into the remote Kalinga highlands, and orders placed by customers. One reason why these nontraditional forms are known as *ay-ayam* or "toys" is that potters have always produced miniature pottery (especially miniature water jars, *im-immosso*) for children to use.

The manufacturing technology involved in producing nontraditional forms is not entirely different from that required for making cooking pots, and some *ay-ayam* (including some money banks and *gusi* forms) are based on globular (pot) shapes.

However, the transfer of part of the technology of cooking pot manufacture to nontraditional forms has had limited success. Kalinga technology for cooking pot manufacture produces a heat-resistant, lightweight product. The nontraditional forms, in contrast, are quite heavy, so that standard firing procedures that yield well-made cooking pots produce underfired, fragile *ay-ayam*. They also require an extensive coating of resin, which is difficult to spread evenly before the fired clay cools and causes the resin to lump. Because they are inadequately fired and have elaborate appendages, *ay-ayam* are easily broken during transit and require elaborate packing for transport on barter trips. Indeed, many forms, such as the clay teapot, the cauldron, and the coffee cups, cannot be used in their traditional functions, since hot liquids would melt the thick layer of resin across the interior surfaces and contaminate the vessel's contents. A similar situation is found among Nigerian potters, whose "European" imitation soup-plates and coffeepots are too porous and weak for regular use (Cardew 1952:197).

The nontraditional forms not only look different from the utilitarian ceramic vessels that Dalupa potters produce, they are also treated differently in the mode and extent of their distribution. Unlike the cooking and water storage pots, which are exchanged for rice and other foodstuffs, the nontraditional forms are sold for Philippine currency (pesos). The *ay-ayam* are costly to make in relation to utility ware, since each piece is amply covered with resin. A single *ay-ayam* may bring three to four times the price of a cooking pot.

Most nontraditional forms (92 percent) are exchanged outside the Pasil boundaries, in neighboring municipalities such as Balbalan and Tabuk, where rice and cash are more abundant (a similar percentage of the traditional vessels was also traded outside Pasil). Almost one-fourth (22 percent) of all pots exchanged in 1988, for example, went to the Balbalan Municipality north of Pasil, and 40 percent of the nontraditional forms were traded in Balbalan. Kalingas find the *ay-ayam* appealing and purchase nontraditional forms to give as gifts. Non-Kalingas in neighboring municipalities are also charmed by the money banks and flower vases, which they purchase as novelty items. In fact, the nontraditional forms are so popular that several nonpotters in Dalupa periodically make plaques, teapots, flower vases, and ashtrays to give as gifts.

The impact of the Chico River Dam project is also evident in the development of Dalupa nontraditional forms. Despite its failure to construct hydroelectric dams in the Kalinga area, the project introduced numerous non-Kalingas into the area. These newcomers, in turn, imbued the region with non-Kalinga values and a desire for "souvenirs" beginning in the late 1970s, according to Dalupa potters. The first water buffalo (carabao) bank, for example, was crafted for an employee of the Batong Buhay Mining Corporation whose gold-mining operations drew workers from different parts of the Philippines. Deer or goat money banks, flowerpots, and flower vases all developed in response to the growing demand for "souvenirs" that non-Kalinga Filipinos could bring home with them from their employment in the area.

Money banks are one common nontraditional form that Dalupa potters manufacture, primarily for decoration rather than for actual use (Pl. II). Dalupa money banks come in an array of forms, from pot-shaped banks to banks in the shape of goats or squash or even horse-and-rider banks. Since Kalinga residents participate in a predominantly barter economy (Takaki 1977), people rarely earn cash that could be stored in money banks. Yet the money banks are extremely popular as gifts



Pl. II. Pot-shaped Kalinga money bank (*arcanda*).

and highly diverse in form. Producing for a market, potters have copied calendar illustrations, ceramics seen in Lubuagan, and illustrations from elementary school science books.

Flower vases are another popular nontraditional form that most (56 percent) active potters produced in the 1987–1988 field season (Pl. III). Although ceramic flower vases were occasionally made in class projects during the 1960s, full-scale production of vases by Dalupa potters began in the late 1970s and early 1980s from two influences (Fig. 5a). Around 1977, Manuel Elizalde (then director of PANAMIN Foundation) ordered a flower vase from one Dalupa potter. Around 1981, a Dalupa schoolteacher (a nonpotter) began experimenting with vase shapes she had seen in markets in Tuguegarao, the provincial capital of Cagayan Province, which lies approximately 60 km northeast of the study area (a three- to four-hour truck ride). As is true of the money banks, the flower vases are decorative rather than utilitarian in function. The tradition of cut-flower arrangements is distinctly non-Kalinga, and Kalinga households do not cultivate flower gardens for decorative purposes.

Flowerpots and ashtrays are now made by most Dalupa potters who manufacture *ay-ayam*. Flowerpots, now entrenched in the Dalupa ceramic inventory, were begun in response to orders from prospective customers in four separate municipalities (Fig. 5b). The inspiration for the Dalupa style lies in ceramic flowerpots seen in Baguio City and Lubuagan. Dalupa potters eclectically copied these styles, creating their own variant. Flowerpots are largely traded to communities located closer to



Pl. III. Flower vase. The shape is one of at least a dozen vase designs Dalupa potters now manufacture. Flower vases are among the most popular nontraditional forms produced.

the Kalinga-Apayao capital of Tabuk, whose inhabitants are better acquainted with lowland Filipino traditions. Ashtrays were also introduced in the late 1970s, largely in response to orders from communities in the Lubuagan Municipality and from employees at the reactivated gold mine at Batong Buhay (Fig. 6a). Sources of inspiration for particular ashtray forms include calendar pictures, plastic ashtrays purchased outside the Pasil Municipality, and book illustrations. Tobacco has been cultivated in northern Luzon since its introduction by the Spanish in the sixteenth century (Keesing 1962:178), and cigarettes are now widely available. Although ashtrays are not a part of traditional Kalinga material culture, ashtrays, unlike money banks and flower vases, may actually be used once they are made.

Another common nontraditional form, the *gusi*, replicates in earthenware the Chinese porcelain jars that are valued Kalinga heirlooms, still used for storing sugarcane wine. Although most of the heirloom porcelain in Dalupa has been sold in the last decade to traders from Manila and Baguio, some porcelain bowls and plates remain in display racks on the walls of Dalupa houses (see also Dozier 1966:150 for photograph of some in Lubuagan). Dalupa potters, responding to orders from prospective customers in Lubuagan, initiated these *gusi* replicas in the later 1970s. *Gusi* range in size from miniatures (c. 20 cm high) to full-sized vessels that are 80–90 cm in height (Fig. 6b). Since *gusi* construction in some ways parallels the construction of traditional wine jars (*amuto*) and cooking pots, many of the “expert” Dalupa potters manufacture *gusi* vessels.

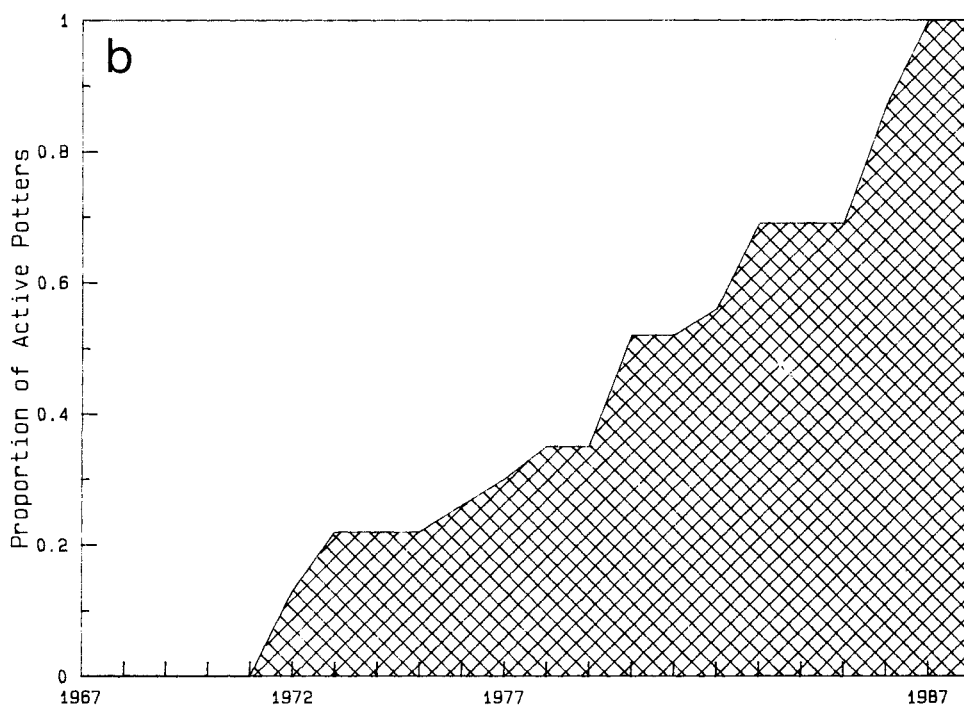
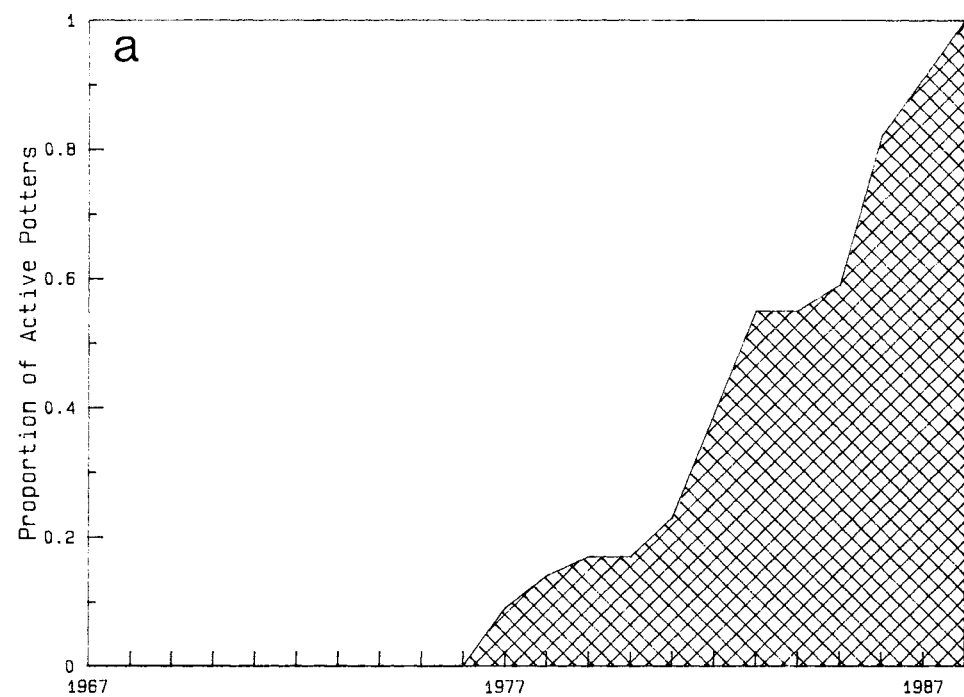


Fig. 5. *a*. Rate of flower vase adoption in Dalupa. *b*. Rate of flowerpot adoption in Dalupa.

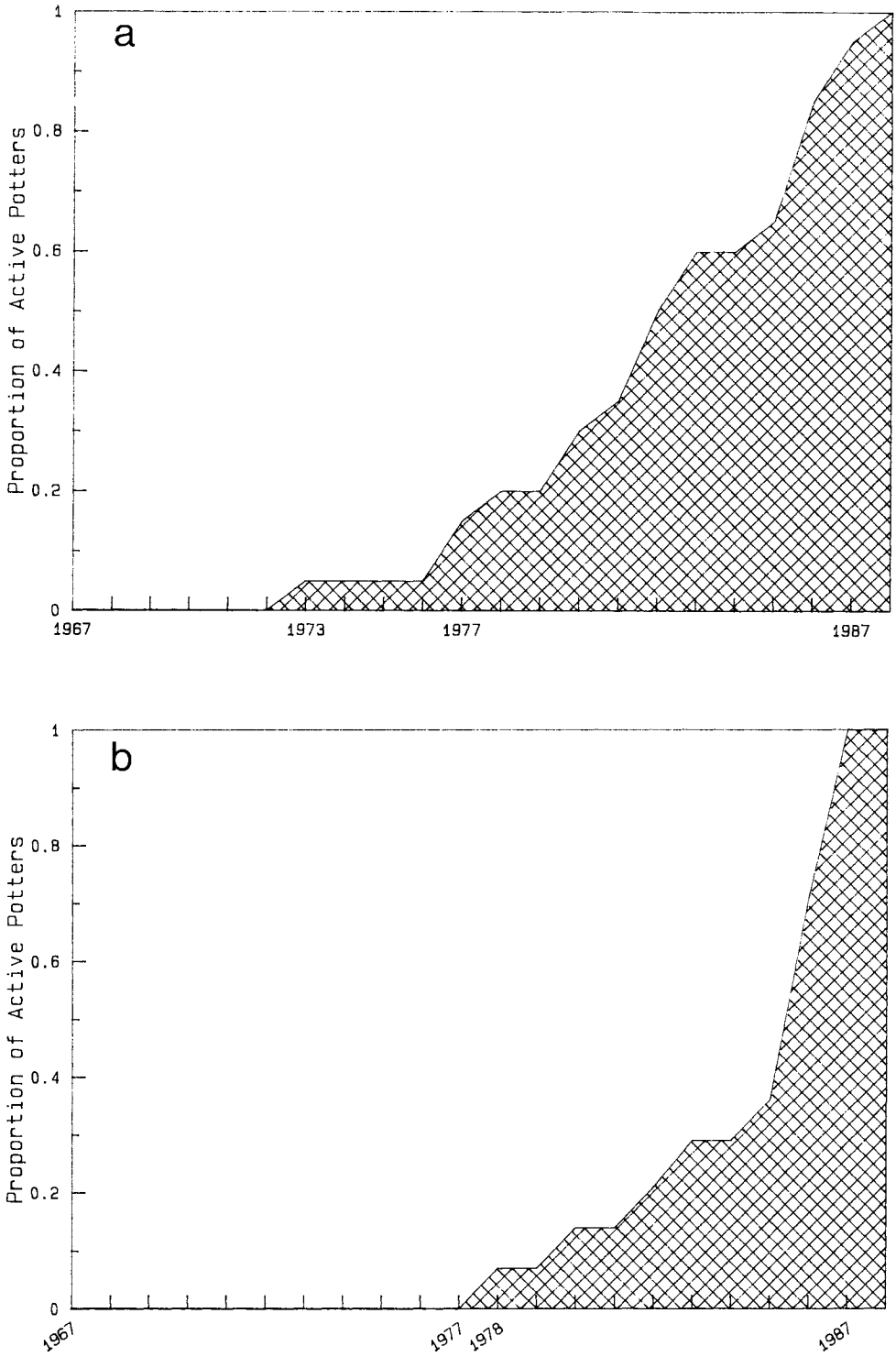


Fig. 6. a. Rate of ashtray adoption in Dalupa. b. Rate of Gusi adoption in Dalupa.

DISCUSSION

Dalupa ceramic traditions have changed in two major respects: in the modification of an extant technology and style for the water jars, and in the development of a decorative ceramic tradition. This study of Dalupa ceramic change is unusual in its focus on technological change as an outgrowth of multivariate processes that link producers and resources to consumers and politics. The increasing articulation of cultural minorities in the region with the national political economy has effected changes at the household and community levels (cf. Voss 1980). Other factors have also influenced processes of Dalupa ceramic change; these include environmental degradation and political strife, the subsequent weakening of social boundaries, the increase in interethnic contacts, the adoption by Kalingas of non-Kalinga traditions, new economic opportunities, and the presence of individual Dalupa innovators.

It is important to understand *why* particular solutions are chosen from among acceptable alternatives in the process of ceramic change; motivations include economics, procurement consideration, and political contingency. In the case of water jars, for example, reducing the resin coating saves both money and time in the firing sessions. The "expert" potters who are part-time specialists strive for high volume production, and it is likely that the decision against a fully resined exterior is partly related to their desire to streamline the production process. Alternative changes, in the face of dwindling resin supplies, might include painting the exteriors in lieu of resin. This procedure had been used on Kalinga water jars, as demonstrated by a few painted vessels that were observed in the Pasil villages during the field season. Paint, however, requires cash and regular contact with the provincial capital of Tabuk, where supplies can be obtained. Still enmeshed in a barter economy, Dalupa potters can barter goods for resin more easily than they can produce cash for paint. A comparable amount of time would be spent applying paint as a surface treatment, saving no time and costing more money. Another alternative, plastic vessels, is prohibitively expensive.

The two types of Dalupa ceramic change that have been described intersect in various ways: in the age of the participants, the timing of the innovation, and the rate of adoption. The age of the potter is relevant only for the oldest (and generally, retired) potters, who no longer have the strength to make large vessels and rarely make nontraditional forms. Ninety-two percent (23 out of 25) of those potters who manufacture *Binontoc*-style water jars also make nontraditional forms. One Dalupa potter (deceased by the time of the 1987–1988 study) greatly contributed to Dalupa stylistic and morphological innovations through introducing new varieties of incised decoration and developing numerous nontraditional forms, such as ashtrays and some shapes of flower vase.

All of these changes occurred within 10 or 15 years. Given the problems with informant reliability in time estimates (see Neupert and Longacre 1990), the precise year of adoption is less important than the point at which the majority of potters adopted a form. Change should be reflected in the ceramic assemblage when more than half of the potters involved in the ceramic innovation produce the new form.

Comparison of the rates of change indicates that many of these changes occurred within a 15-year period. The Dalupa data presented here suggest, for example, that estimates of ceramic replacement in the American Southwest of 25 years or less are plausible (Graves 1984; Montgomery and Reid 1990).

TABLE 2. FREQUENCIES (AND NUMBERS) OF DALUPA-MADE VESSELS IN GUINA-ANG AND DANGTALAN

VESSEL FORM	GUINA-ANG	DANGTALAN
Water jar (<i>immosso</i>)	71% (85)	29% (23)
Meat/vegetable cooking (<i>oppaya</i>)	28% (206)	13% (59)
Rice cooking (<i>ittoyom</i>)	33% (238)	3% (13)
Total representation of Dalupa pots in assemblage	34% (553)	10% (95)
Average number of Dalupa pots per household	5.4	1.5

Gauging the Rate of Dalupa Ceramic Innovations

One index of the success of Dalupa's pottery innovations lies in the frequency of Dalupa-made water jars in non-Dalupa household pottery assemblages. Because nearly all pots inventoried in Dalupa were locally manufactured, the Dalupa inventory data were eliminated from primary consideration in this study. The 1987-1988 field season focused its efforts on three Pasil Municipality villages. Two of those communities produce pottery (Dalupa and Dangtalan), while the third village, Guina-ang, is considered a "pottery-consuming" community.

Data from Dangtalan and Guina-ang household pottery inventories were gathered to assess the contribution of Dalupa-made vessels to pottery inventories in these two communities (Table 2). Interviews with Guina-ang residents previously reflected a general preference for Dangtalan-made pottery (Aronson et al. 1990). It was assumed that Dangtalan residents, like their Guina-ang neighbors, would favor products from Dangtalan over those from Dalupa. Although Dangtalan households, on average, have a smaller proportion of Dalupa pots than do Guina-ang households, Dalupa water jars (*immosso*) are disproportionately represented. In Guina-ang, where one-third of the vessels are from Dalupa, the pattern is even clearer: Nearly three-fourths of the water jars derive from Dalupa.

When interviewed, Guina-ang residents expressed an aesthetic preference for Dalupa *Binontoc* water jars over traditional water jars from Dangtalan (Aronson et al. 1990). When their households were inventoried, *Binontoc*-shouldered, decorated jars were well represented. *Binontoc* water jars constituted over 40 percent of the Dalupa *immosso* in Guina-ang households. A similar percentage of shouldered water jars was found in Dalupa households, where 100 percent of the Kalinga water jars were Dalupa-made. The Guina-ang preference for *Binontoc* vessels constitutes one endorsement of the decorative other designs and innovative vessel shapes that Dalupa potters attempted as part of the process of ceramic change. Previously recorded mean vessel use-life figures for Kalinga water jars ranged from 7.18 to 8.17 years for Dalupa and Dangtalan respectively (Longacre 1985). Some water jars recorded in the Dalupa inventory exceeded 10 years in age, so the total impact of these innovations may not appear until the mid-1990s. Yet data from the late 1980s indicate that the water jar innovations have been accepted by "pottery consumers" in two communities sampled.

Gauging the relative acceptance rate of the nontraditional forms is more problematic than in the case of the *Binontoc* water jars. The demand for *ay-ayam* comes largely from outside the Pasil Municipality: nine-tenths of nontraditional forms

were traded outside municipality boundaries in 1988. Factors inhibiting Dalupa potters' ability to travel outside of Pasil could reduce the demand for, and the production of, *ay-ayam*. Intensified tribal warfare, environmental disasters (like the July 1990 earthquake), and transport rerouting that causes trucks traveling through Lubuagan to bypass the Pasil Municipality are three such factors (see Lackey [1988] for a parallel case in Mexico).

There are reasons to believe that the *ay-ayam* will become an established component of the Dalupa ceramic repertoire, from both the producer and consumer standpoints. The Dalupa nontraditional forms have appeal as agents in the process of competitive emulation. As in Miller's (1982) study of potters in central India, Dalupa potters seek to raise their own status by appropriating the customs—and the material culture—of higher status social groups. A wide range of aesthetic possibilities exists in the world of Kalinga *ay-ayam*. Wooden plaques emblazoned with the words "God Bless Our Home" that hang in homes in the Kalinga provincial capital are imitated in clay by Dalupa potters. Designs from southern Mindanao are adapted into new flower vase forms. Full-sized clay *gusi* jars provide a substitute for the rare and costly porcelain originals. Although the particular forms that the *ay-ayam* take may appear whimsical to the outsider, it is through this new tradition that Dalupa potters emulate non-Kalinga values. The modernity and relative affluence of lowland Filipino life is replicated in clay in the Kalinga village of Dalupa.

Economically, the nontraditional forms are a sound investment for inexperienced Dalupa potters. Women with a limited range of traditional ceramic skills can successfully produce and sell *ay-ayam*. The groups of Dalupa potters who make traditional and nontraditional ceramics overlap, but many younger potters concentrate on the production of ashtrays and flower vases. Most of these potters producing *ay-ayam* are in their child-bearing years. The production of nontraditional forms meets economic needs for Dalupa households with rapidly expanding membership. Faced with fewer economic alternatives than those available to the neighboring village of Dangtalan, Dalupa potters will likely continue their ceramic specialization, and *ay-ayam* will continue to flourish in the near future.

Archaeological Implications

General causes behind ceramic change have been identified in the archaeological record, and the functional consequences of such shifts in ceramic technology and style have begun to be explored (e.g., Braun 1983; Schiffer and Skibo 1987). Functional explanations alone, however, provide only partial explanations in multicausal processes of change. Neither technological nor nontechnical (including aesthetic) factors likely play primary roles in all such changes (e.g., Smith 1970). Nontechnical forces—"from the human personality of the inventor to the social, political and cultural milieu"—shape the nature and timing of technological changes throughout time (Kranzberg 1986:553; Lechtman 1984).

This Dalupa ethnoarchaeological study of ceramic change has implications for the construction of explanatory models for ceramic change in the archaeological record. Change in the Dalupa assemblage represents a response to a variety of factors (environmental, ecological, and political), none of which can be considered of primary importance. Additional research is needed on factors that encourage the invention and adoption of new technologies as reflected in archaeological assemblages (e.g.,

van der Leeuw 1989). The ethnographic record is one source of valuable information in this regard (see Bargatzky's [1989] discussion of critical issues).

The Dalupa case study also has interest for archaeologists since ceramic change in the Dalupa assemblage is observable at the levels of both attribute and assemblage. Morphological adjustments and stylistic additions on the water jars constitute attribute changes, and the introduction of the *ay-ayam* represents an assemblage change. Change occurs not only on two different levels but also apparently at correspondingly different rates. Attribute-level changes, embodied in the *Binontoc* style, gradually permeate the potter community. Assemblage-level changes, such as the introduction of nontraditional forms, are adopted rapidly. The Dalupa case is also instructive in its demonstration that ceramic change need not involve total replacement. Not all producers, or all products, are affected by innovation for a substantial period of time.

CONCLUSION

Archaeologists assume that material culture will reflect widespread changes in a prehistoric cultural system, and the Dalupa case conforms to this assumption. The study of ceramic change is integral to explaining historical developments. Archaeologists have the advantage of a long-term perspective, while also suffering the disadvantage of distance from the producers and users of prehistoric technologies. Careful uses of analogy are essential to archaeological interpretation, and the ethnographic record contains a wealth of archaeologically relevant information. It is hoped that such case studies will contribute to a general understanding of ceramic change, through examining both the material products and the sociocultural contexts in which change can occur.

ACKNOWLEDGMENTS

Research for this paper was funded by National Science Foundation grant BNS 87-10275 to William Longacre, and grants from the Arizona-Nevada Academy of Science, the University of Arizona Graduate Development Fund, and the Department of Anthropology Educational Fund to Miriam Stark. My deepest thanks are extended to the Kalinga community of Dalupa Pasil for an unrivaled generosity of spirit and an amused tolerance of ethnoarchaeologists. Special thanks are due to Josephine Bommo-gas and Narcisa Waggawag of Dalupa Pasil for help with data collection. William Longacre and James Skibo contributed thoughtful comments. Members of the Department of Anthropology Writers' Group provided stimulating critique and helpful suggestions; members include Douglas Craig, Mark Elson, Kelley Hays, Laura Levi, Masa Tani, John Welch, Douglas Wilson, and Lisa Young. Drafting of figures 1–3 was done by Ronald Beckwith. I accept full responsibility for any weaknesses that remain in the paper.

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